

## LETTERS

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### OBSERVATIONS OF KING VULTURES (*SARCORAMPHUS PAPA*) DRINKING AND BATHING

Despite the extensive geographic range of the king vulture (*Sarcoramphus papa*) from central Mexico to northern Argentina, little is known about its life history (L. Brown and D. Amadon 1968, *Eagles, hawks, and falcons of the world*. McGraw-Hill, New York, NY U.S.A.; J. del Hoyo, A. Elliot and J. Sargahal 1994, *Handbook of the birds of the world*, Vol. 2, *New world vultures to guineafowl*. Lynx Edicions, Barcelona, Spain). During the dry season from March through June 1993–95, we observed king vultures opportunistically during a study of the orange-breasted falcon (*Falco deiroleucus*) in Belize and Guatemala. We observed king vultures drinking and bathing from a series of large, clear pools above a 300 m waterfall (ca. 1000 m amsl) in the Mountain Pine Ridge area of the Maya Mountains, Cayo District, Belize. Topographic relief is extreme, with ridgetops and high plateaus dominated by Caribbean Pine (*Pinus caribaea*) and tropical semi-deciduous forest occurring in valleys and lowlands. The creek-fed pools used by the vultures were eroded into the granitic bed rock, free of vegetation for more than 10 m on either side, and completely open downstream where the water plunged over a precipitous valley edge. King vultures were observed at this site at all times of day throughout our observation period. They were seen perched in trees or on the ground at pools, sunning in a spread-wing posture, preening, drinking and bathing. At times, they soared on the strong updrafts above the area.

On 19 March 1993, we saw 12 individuals (9 adults and 3 subadults) above the waterfall. Seven adults and one subadult periodically drank while the remaining four bathed vigorously. All these vultures had visibly distended crops indicating they had recently fed. On 18 May 1994, we observed similar behavior by five adults; four were drinking and one was bathing, but none had visibly distended crops. On 31 March 1995, four vultures were perched above the waterfall, four soared nearby, and three perched in trees within 500 m of the falls. Of the four above the waterfall, two were adults and two were subadults; all four were observed drinking and one adult and one subadult were also seen bathing. Of these four vultures, only the nonbathing subadult had a visibly distended crop.

Houston (1984, *Ibis* 126:67–69; 1988, *Ibis* 130:402–417) has shown that king vultures probably do not locate food by smell but follow vultures of the genus *Cathartes* to carcasses. Lemon (1991, *Wilson Bull.* 103:698–702), in contrast, found that king vultures sometimes arrived first at carcasses in forests, and speculated that nonvisual cues, possibly including olfaction, were used to locate carrion. If king vultures depend in part on the olfactory ability of *Cathartes* in finding food, then they may have to feed largely on desiccated carrion, especially in areas with pronounced dry seasons, necessitating drinking to maintain adequate water balance.

Koford (1953, *The California Condor*. National Audubon Society, New York, NY U.S.A.) described frequent drinking and bathing by California condors (*Gymnogyps californianus*). He suggested that California condors prefer clean pools above waterfalls (similar to those where we observed king vultures) but noted that they will drink from a variety of sources including stagnant pools in potholes when necessary. Similarly, McGahan (1972, *Behavior and ecology of the Andean Condor*. Ph.D. dissertation, University of Wisconsin, Madison, WI U.S.A.) observed Andean condors (*Vultur gryphus*) drinking and bathing in pools on cliff ledges. Koford concluded that drinking by California condors, though irregular in occurrence, is necessary, and emphasized that “. . . the protection of frequented watering places from disturbance is highly essential to the welfare of condors.”

To our knowledge there are no previously published observations of drinking or bathing by wild king vultures. It remains uncertain whether king vultures depend on drinking to maintain water balance. While many carnivorous birds can live for months without drinking, this hinges on the thermal environment and preformed water content of the diet (Bartholomew and Cade 1963, *Auk* 80:504–539). M. Schlee (pers. comm.) suggests that captive cathartids drink more in general than do old world vultures, and attributes this to use of urohidrosis by the former. If king vultures need to drink and/or bathe regularly, then the distribution of suitable drinking and bathing sites could be an important determinant of habitat quality and hence of the distribution and population density of this species.

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### OBSERVATIONS OF A PAIR OF NESTING COOPER'S HAWKS IN SAN FRANCISCO, CALIFORNIA

Increasing attention has been focused on raptor species that nest in urban environments (L. Oliphant and E. Haug 1985, *J. Raptor Research* 19:56–59; P. Bloom et al. 1993, *J. Wildl. Manage.* 57:258–265; C.M. White 1994, *Studies in Avian Biology* 15:161–172; R.N. Rosenfield et al. 1995, *J. Raptor Research* 29:1–4). In this letter, we report observations of nesting Cooper's hawks (*Accipiter cooperii*) in San Francisco, California. To our knowledge, this is the first nest record for the species in the city and county of San Francisco, California.

The breeding territory was located in the Fort Funston National Recreation Area, located on the immediate Pacific coast in the southwestern region of San Francisco. This area is a unit within the Golden Gate National Recreation Area and is administered by the U.S. Park Service, Department of Interior. Vegetation in the area consists primarily of exotic species, occurring as patchy stands of eucalyptus (*Eucalyptus spp.*) or Monterey cypress (*Cupressus macrocarpa*) interspersed with open sand dunes dominated by sea fig (*Carpobrotus aequilaterus*). Several paved paths dissect the area, which receives extensive human use primarily in the form of dog walkers, hikers and tourists. Literally scores of unleashed dogs and walkers inundated the immediate nest area daily.

Adult Cooper's hawks were sporadically observed in this area from May–July 1994. During September 1994 a stick nest was observed in a eucalyptus tree approximately 8 m from a heavily-used paved path. Prey remains, whitewash and molted Cooper's hawk feathers at the base of the nest tree and fresh down present around the rim of the nest suggested a pair of Cooper's hawks attempted to nest during the 1994 breeding season. The nest was located 9.4 m above the ground in a 41 cm diameter at breast height eucalyptus tree. The nest tree was located in a mixed stand of eucalyptus and cypress that was approximately 200 m long and 50 m wide.

On 24 March 1995, Cooper's hawks were first observed in the area when an adult male was seen pursuing flocks of Brewer's blackbirds (*Euphagus cyanocephalus*) and rock doves (*Columba livia*) over a paved parking lot located approximately 300 m south of the 1994 nest stand. A second-yr female carrying a stick flew into the nest stand. A stick nest was observed in a eucalyptus tree approximately 90 m south of the 1994 nest tree. The nest tree was located within a few meters of both a popular picnic table and a heavily-used path. On 4 April, the female was observed incubating in this nest. On the morning of 23 April, neither the female nor male was found in the nest stand area, the nest had fallen out of the tree and several egg shell fragments were located at the base of the tree. Although we could not determine the cause of the nest failure, we suspect that the nest may have blown out of the tree. The nest appeared to be poorly constructed and was situated on a bluff along the immediate coast overlooking the Pacific Ocean, an area regularly buffeted by strong onshore winds.

On 27 April, the pair was observed in the immediate vicinity of the 1994 nest site. A copulation was observed at this nest site on 29 April following a prey delivery by the male. On 7 May, the female was observed feeding at a plucking post and the male was perched on the rim of the nest. Another copulation was observed on 9 May following another prey delivery. Egg laying and incubation were estimated to have been initiated on 9–11 May. Hatching was estimated to have occurred on 12–15 June. On 17 June, the female was observed feeding nestlings and on 24 August, a single fledgling was seen perched near the nest. The fledgling apparently dispersed soon after this date and was not observed on subsequent visits.

Limited observations of prey deliveries and prey remains resulted in identification of six prey species: five birds, Brewer's blackbird, rock dove, mourning dove (*Zenaidura macroura*), scrub jay (*Aphelocoma coerulescens*), American robin (*Turdus migratorius*), and one mammal (an unknown sciurid).

Our observations showed that this pair of Cooper's hawks was able to exploit a breeding territory with a high degree of human activity. Limited food observations indicated that these hawks preyed on both introduced and native species that are common within the urban environment of San Francisco. Further, they were able to use an introduced nonnative tree species for nesting. Eucalyptus trees are widely distributed throughout western California in both urban and natural environments and are commonly used by raptors such as red-shouldered hawks (*Buteo lineatus*),